

Appl. No. : 10/634,175
Filed : August 4, 2003

REMARKS

In response to the Office Action mailed May 12, 2004, Applicant has amended the application as above. No new matter is added by the amendments as discussed below. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the amendments and the remarks set forth below.

Discussion of Claim Amendments

Claims 2 and 4-10 have been cancelled. Claim 1 has been amended. Upon the entry of the amendments, Claims 1, 3 and 11-12 are pending in this application. The amendments to Claim 1 are supported by, for example, original Claim 2, respectively. New Claims 11 and 12 are supported by, for example, original Claims 5 and 8, respectively. Thus, no new matter is added by the amendments. Applicant respectfully requests the entry of the amendments.

Discussion of Specification Objection

The Examiner has objected to the abstract of the disclosure asserting that the abstract uses the legal phraseology "comprises." In reply, Applicant has amended the term from "comprises" to "includes." Withdrawal of the objection is respectfully requested.

Discussion of Patentability of Claims 1 and 3

The Examiner has rejected Claims 1 and 3 under 35 U.S.C. § 102(b) as being anticipated by Hinako, et al (JP 410258307A). The Examiner has also rejected Claims 2 and 4 under 35 U.S.C. § 103(a) as being unpatentable over Hinako in view of Onishi, et al (U.S. Patent No. 4,545,428). As discussed above, Claims 2 and 4 have been cancelled and the limitation of Claim 2 has been incorporated into Claim 1. As discussed below, amended Claim 1 is allowable over Hinako and Onishi.

In order to provide a *prima facie* showing of obviousness, the U.S. Patent and Trademark Office has the burden to show a motivation, teaching, or suggestion to cause one of ordinary skill in the art to make the modification or combination asserted by the Examiner to be obvious. *See, e.g., In re Fine*, 5 U.S.P.Q.2d 1597 (Fed. Cir. 1988).

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Amended Claim 1 recites, among other things, that the number of balls is limited to 2 to 3 and that a lead angle Θ of said grooves of the grooved plug to the axis is limited to 26 to 45 degrees. According to one embodiment of the claimed invention, the machining speed of the internal groove tube reached the maximum by the use of two to three balls, in case of the grooved plugs having the groove lead angle Θ of 26-45 degrees. *See Figure 7 and the specification, paragraph [0055]*. As shown in Figure 7, the combination of the number of balls and the lead angle (θ) is critical to successful manufacture at high grooving speed. Applicant respectfully submits that there is no motivation to combine Hinako and Onishi to arrive at the claimed invention as discussed below.

Hinako is directed to configuring the rotational direction of compression balls (1) the same as that of a groove plug (2) in order to avoid the breakage of the groove plug (2). *See the abstract of Hinako*. Referring to Figures 1 and 4, Hinako shows that four compression balls (1) are arranged on the outside surface of a tube (3). Nowhere in Hinako is there disclosure that a lead angle Θ of said grooves of the grooved plug to the axis is limited to 26 to 45 degrees recited in Claim 1. The Examiner also acknowledged as such. *See the Office Action, third paragraph*.

Furthermore, there is no disclosure in Hinako regarding the relationship between the number of balls and the lead angle θ in connection with improving the machining speed. Although Hinako discloses that "two or more" balls can be arranged in the outside surface of the tube (3) (*see paragraph [001]*), Hinako says nothing about any possible relationship between the number of balls and the lead angle.

Onishi discloses that the helical angle of the grooves with respect to the tube axis is in the range between 16° and 35°. *See column 2, lines 19-20*. However, as can be seen in Figure 7, for the lower half of Onishi's angle range (16-25 degrees), it is better to use 5 or 6 balls to maximize machining speed. For the upper half of Onishi's angle range (25-35 degrees), it is better to use 2 or 3 balls to maximize machining speed. In fact, the worst possible choice of ball number for the production of the pipes of Onishi would be 4 balls, which is exactly the specific number shown in Hinako's preferred system.

It is the essence of hindsight reconstruction of the invention to say it would be obvious to use the upper portion of the angle range of Onishi with lower portion of Hinako's disclosure of "two or more" balls to say that the invention of Claim 1 is obvious. At best, the Examiner's

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assertion is based on the idea that it might be obvious to try different groove pitches and numbers of balls to find the best combination. However, as stated in MPEP 2144.05 (II)(B), only result effective variables can ever be considered obvious to optimize. In this case, it cannot be considered obvious to optimize two variables together to obtain an improvement that has not been associated with the variables before.

In summary, Hinako says nothing about the relationship between the number of balls and the lead angle in connection with providing the maximum machining speed. Furthermore, Onishi is directed to improving heat transfer coefficient and does not disclose anything regarding the improvement of the machining speed of the heat transfer tube. Thus, even though Onishi discloses the helical angle of 16-35 degrees, one skilled in the art would not have been motivated to combine the teachings of Hinako and Onishi to arrive at the claimed invention. Furthermore, Applicant respectfully submits that Robinson, et al (U.S. Patent No. 6,164,370) does not cure the deficiency of the Onishi-Hinako combination. In view of the above, Applicant respectfully submits that no prima facie of obviousness has been established. Thus, Claim 1 is allowable over prior art of record.

Claim 3 depends from base Claim 1, and further defines additional technical feature of the present invention. In view of the patentability of its base claim, and in further view of the additional technical feature, dependent Claim 3 is patentable over the prior art of record.

Discussion of Rejection of Claims 5-10

The Examiner has rejected Claims 5-10 under 35 U.S.C. § 102(e) as being anticipated by Robinson, et al (U.S. Patent No. 6,164,370). In order to expedite the prosecution of the application, Applicant has cancelled Claims 5-10.

Discussion of New Claims 11-12

New Claims 11-12 depend from base Claim 1, and further define additional technical features of the present invention. In view of the patentability of their base claim, and in further view of the additional technical features, new Claims 11-12 are patentable over the prior art of record.

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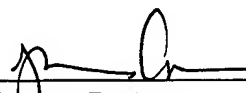
CONCLUSION

In view of Applicant's foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 8/3/04

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